NASA/JPL
4800 Oak Grove Dr.
Pasadena, CA 91109
ID no.: 11887

EQUIPMENT DESCRIPTION:

SECTION H:

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions	Conditions
Process 1: INTERNAL COMBUSTION EQUIPMENT					
System 10: BUILDING 302					
INTERNAL COMBUSTION ENGINE, EMERGENCY POWER, DIESEL FUEL, CUMMINS, MODEL NO. QSX15-G9, DIESEL PARTICULATE FILTER AND DIAGNOSTIC BACK PRESSURE MONITOR, JOHNSON MATTHEY, MODEL NO. CRT, WITH AFTERCOOLER, TURBOCHARGER, 755 BHP A/N 540642	D168		NOX: PROCESS UNIT	NOx + ROG: 4.8 G/BHP-HR DIESEL (4), CO: 2.6 G/BHP-HR DIESEL (4), PM: 0.15 G/BHP-HR DIESEL (4), NOX: 469 LBS/1000 GAL DIESEL (1), PM (9)	B61.1, B61.3, D12.2, E193.1, E448.2, H23.9, I297, K67.10

To Be Removed from Section D when P/O is issued:

System 10: BUILDING 302					
INTERNAL COMBUSTION ENGINE, EMERGENCY POWER, DIESEL FUEL, WITH AFTERCOOLER, TURBOCHARGER, 535 BHP A/N 458452	~~D15~~		NOX: PROCESS UNIT	NOX: 469 LBS/1000 GAL DIESEL (1); PM	B61.1, C1.1, E114.1, H23.9, K67.10

A/N 540643: RECLAIM Amendment/Title V Permit Revision

CONDITIONS:

B61.1:
The operator shall not use fuel oil containing the following specified compounds:

Compound	Weight Percent
Sulfur less than or equal to	0.05

B61.3:
The operator shall not use fuel oil containing the following specified compounds:

Compound	PPM BY WEIGHT
Sulfur less than or equal to	15

D12.2:
The operator shall install and maintain a(n) non-resettable elapsed time meter to accurately indicate the elapsed operating time of the engine.

E193.1:
The operator shall operate and maintain this equipment according to the following requirements:

The diagnostic back pressure monitor shall be programmed to send an audible or remote alarm to the operator whenever the back pressure of the diesel particulate filter exceeds the maximum back pressure settings specified by the manufacturer.

The exhaust temperature of the engine shall be at least 465 degrees Fahrenheit, except during cold engine start-up which shall not exceed 30 minutes.

The diesel particulate filter shall be regenerated after every 24 consecutive cold starts and 30-minute idle sessions, or, whenever a warning signal is received from the back pressure monitor, whichever occurs first. The exhaust temperature of the engine shall be at least 465 degrees Fahrenheit during regeneration of the diesel particulate filter.

The engine shall not be operated for more than 720 minutes when it is operating below the regeneration temperature of 465 degrees Fahrenheit.

The operator shall keep adequate records of inspections, replacements and manual regenerations of the diesel particulate filter. All records shall be prepared in a format which is acceptable to the District, retained on the premises for at least five years and made available to District personnel upon request.

E448.2:
The operator shall comply with the following requirements:

The engine shall not be operated more than 200 hours in any one year, which includes 50 hours in any one year for maintenance and testing.

Operation beyond the allotted time for engine maintenance and testing shall be allowed only in the event of a loss of grid power or up to 30 minutes prior to a rotating outage, provided that the utility distribution company has ordered rotating outages in the control area where the engine is located or has indicated that it expects to issue such an order at a certain time and the engine is located in a utility service block that is subject to the rotating outage.

In the event as described in the paragraph above, the engine shall be terminated immediately after the utility distribution company advises that a rotating outage is no longer imminent or in effect.
This engine shall not be used as part of an interruptible service contract in which a facility receives a payment or reduced rates in return for reducing electric load on the grid when requested by the utility or the grid operator.

H23.9:
This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
Sulfur compounds	District Rule	431.2
PM	District Rule	1470

K67.10:
The operator shall keep records, in a manner approved by the District, for the following parameter(s) or item(s):

An engine operating log shall be kept and maintained on file to record when this engine is started manually. The log shall list the date of operation, the timer reading in hours at the beginning and end of operation and the reason of operation.

By January 15th of each year, the operator shall total and record the total hours of operation (including hours for both manual operation and automatic operation) for the previous year.

All records required by this permit shall be kept in a format that is acceptable to the District, shall be retained on the premises for at least three years and shall be made available to any District representative upon request.

I297:
This equipment shall not be operated unless the facility holds 382 pounds of NOx RTCs in its allocation account to offset the annual emissions increase for the first year of operation. RTCs held to satisfy this condition may be transferred only after one year from the initial start of operation. If the hold amount is partially satisfied by holding RTCs that expire midway through the hold period, those RTCs may be transferred upon their respective expiration dates. This hold amount is in addition to any other amount of RTCs required to be held under other condition(s) stated in this permit.

BACKGROUND:

NASA/JPL submitted application no 540642 to permit a new emergency, diesel-fueled internal combustion engine. The engine will be a replacement for D15, used to power an electrical generator for emergency electrical power. The engine was issued an AQMD certification permit, under A/N 455700. The engine meets current BACT emission limits for major-source facilities, EPA's Tier 2 emission standards.

NASA/JPL is a RECLAIM/Title V facility. A Title V renewal permit was issued to this facility on October 18, 2011. NASA/JPL has proposed to revise their Title V renewal permit by adding an internal combustion engine, device no. D168, to replace a smaller engine, D15. This permit

revision is considered as a "significant permit revision" for non-RECLAIM pollutants or hazardous air pollutants (HAPs) and a "minor permit revision" for RECLAIM pollutants to the RECLAIM/Title V renewal permit, as described in the Regulation XXX evaluation.

PROCESS DESCRIPTION:

The engine will be used to provide emergency electrical power for building operations. Aside from emergency use, the engine will be operated less than 50 hours in any one year for maintenance and testing purposes. Annual hours of operation shall not exceed 200 hours. A Johnson Matthey CRT diesel particulate filter will be installed on the engine. The filter has been CARB-verified to reduce PM emissions by 85% or greater. The diesel particulate filter system includes a diagnostic back pressure monitor that monitors engine back pressure and alarms the operator when pressure exceeds the manufacturer's maximum settings. Regeneration of the filter is required after 24 consecutive cold starts and 30-minute idle sessions or whenever a warning signal is received from the monitor. During the regeneration period, the engine exhaust temperature is required to be at least 465 deg. F. Condition no. E193-1 is for the proper operation of the diesel particulate filter.

EMISSIONS CALCULATIONS:

Uncontrolled emissions data (AQMD certification):

Pollutant	Manufacturer Engine Rate (g/bhp-hr)
HC	0.11
NOx	4.59
CO	0.45
PM	0.075

CRT Particulate Filter System control efficiency: PM = 85%

Controlled emissions data:

Pollutant	Manufacturer Engine Rate (g/bhp-hr)
HC	0.11
NOx	4.59
CO	0.45
PM	0.011

Operating schedule = 1 hr/wk, 1 day/wk
BHP = 755
1 lb = 454 g
PM_{10} = PM

R1=R2 Hourly HC emissions = 0.11 * 1/454 * 755 = 0.18 lb/hr
Daily HC emissions = 0.18 lb/day

R1=R2 Hourly NOx emissions = 4.59 * 1/454 * 755 = 7.63 lb/hr
Daily NOx emissions = 7.63 lb/day
Annual NOx emissions = 7.63 lb/hr x 50 hr/year = 382 lb/year

R1=R2 Hourly CO emissions = 0.45 * 1/454 * 755 = 0.75 lb/hr
Daily CO emissions = 0.75 lb/day

R1 Hourly PM_{10} emissions = 0.075 * 1/454 * 755 = 0.127 lb/hr
Daily PM_{10} emissions = 0.127 lb/day

R2 Hourly PM_{10} emissions = 0.011 * 1/454 * 755 = 0.018 lb/hr
Daily PM_{10} emissions = 0.018 lb/day

RULE ANALYSIS

Rule 212 (c)(1): This section requires a public notice for all new or modified permit units that emit air contaminants located within 1,000 feet from the outer boundary of a school. The facility is not located within 1,000 feet of the outer boundary of a school. The closest school is located over 1,700 feet from the facility. Public notice not required by this section.

Rule 212 (c)(2): This section requires a public notice for all new or modified facilities that have on-site emission increases exceeding any of the daily maximums as specified by Rule 212(g). The emission increase from the engine does not cause an exceedance of the daily maximums. All criteria pollutants are <1 lb/day, except NOx = 7.63 lb/day [less than the 212(g) threshold of 40 lb/day]. Public notice not required by this section.

Rule 212(c)(3): This section requires a public notice for any new or modified permit unit with an increase in emissions of toxic air contaminants listed in Table I of Rule 1401 resulting in an MICR greater than 1E-6 per permit unit or greater than 10E-6 per facility. Diesel PM from diesel-fueled IC engines are considered carcinogenic. Hourly PM emissions from the previous engine (0.06 lb/hr) are greater than those from the new engine (0.018 lb/hr) and hence, there will not be an increase in the cancer risk from operating the new engine. Additionally, the cancer risk from the new engine, based on PM emissions of 0.018 lb/hr, are 3.98E-08 and 3.27E-08 at the residential and commercial receptors, respectively. A public notice is not required for this project since there will not be a cancer risk equal or greater than one in a million.

Rule 212(g): This section requires a public notice for all new or modified sources that result in emission increases exceeding any of the daily maximums specified by Rule 212(g). The emission increase from the engine is below the daily maximums.

	Maximum Daily Emissions (lb/day)					
	ROG	**NO_x**	**PM_{10}**	**SO_2**	**CO**	**Pb**
Emission increase	0	7.6	0	0	0.75	0
MAX Limit	**30**	**40**	**30**	**60**	**220**	**3**
Compliance Status	Yes	Yes	Yes	Yes	Yes	Yes

Rules 401 & 402: AQMD database has no records of visible emissions or nuisance complaints against this facility. Compliance with these requirements is expected with the proper operation of the equipment.

Rule 431.2: NASA/JPL uses a diesel fuel in which the sulfur content does not exceed 15 ppm by weight (0.0015% by weight). Compliance is expected.

Rule 1110.2: Emergency engines limited to 200 hrs/yr operation are exempt from (d) requirements under (i)(2).

Rule 1303(a): BACT is compliance with EPA's Tier 2 emission limits. The AQMD-certified engine is designed and manufactured to operate under specific BACT emission limits. Compliance with BACT is expected.

	NOx + ROG (Gm/bhp-hr)	**CO (**Gm/bhp-hr)	**PM (**Gm/bhp-hr)
Required	4.8	2.6	0.15
Actual	4.62	0.09	0.011
Compliance	Yes	Yes	Yes

Rules 1303(b)(1) & 1303(b)(2): Emergency ICEs are exempt from modeling requirements and emission offsets under 1304(a)(4)- emergency equipment.

Rule 1303(b)(4): The facility is expected to be in full compliance with all applicable rules and regulations of the District.

Rule 1401: Exempt under (g)(1)(F) – emergency IC engines.

Rule 1470: Under (c)(1), compliant fuel will be used in the engine and under (c)(2)(B) & (C), the engine will be operated in compliance with these sections.

RULE 2005: The ICE meets the requirements of Rule 2005(c), that is, it will (1) be operated with current BACT, (2) is exempt from modeling requirements [Rule 2005(k)(5)] and (3) the facility holds sufficient RECLAIM trading credits to offset the annual emission increase for the first year of operation of the ICE.

40 CFR60, Subpart IIII: This subpart requires new engines less than 3,000 BHP ordered after July 11, 2005 to meet appropriate Tier 2 or Tier 3 standards, as applicable based on their horsepower rating. See *Rule 1303(a)* above for emission standards.

Additional NSPS Requirements for New Emergency Engines:

	NSPS Requirement	Proposed Equipment	Compliance
New Engine	Ordered After July 11, 2005	Yes	Yes
Emission Standards Pre-2007 model year	Tier 1 standards	No	Not applicable
Emission Standards 2007 model year and later	Meet Tier emission standards (Tier 2 if not Tier 3)	Certified Tier 2 emission limits are specified in permit	Yes
Fuel Requirement	Ultra low-sulfur diesel (15 ppmv)	Included in permit condition	Yes
Monitoring/Recordkeeping/ Reporting	Non-resettable hour meter	Included in permit condition	Yes
Recordkeeping	If engine does not meet non-emergency standards	Recordkeeping included in permit condition	Yes
Reporting	None	None	Not applicable

40 CFR60, Subpart JJJJ: The requirements of this subpart are not applicable to compression ignition engines.

40 CFR63, Subpart ZZZZ: NASA/JPL is an Area Source for HAP. The requirements of this subpart are therefore applicable. Since the engine is a new RICE (manufactured after June 12, 2006), it must meet emission standards in 40 CFR part 60 subpart IIII. The engine meets the emission limits as demonstrated above. In addition, the engine will meet all other applicable NESHAP requirements as summarized in the following table:

Other Requirements in the NESHAP for New Emergency Engines:

	NESHAP Requirement	Proposed Equipment	Compliance
New Engine	Ordered On or After June 12, 2006	After June 12, 2006	Yes
Emission Standards	Meet NSPS standards	Yes	Yes
Operating Limitations	None	200 hrs/yr, included in permit condition	Yes
Fuel Requirement	None	Ultra low sulfur diesel (15 ppm), included in permit condition	Yes

	NESHAP Requirement	Proposed Equipment	Compliance
Requirements	No limits on hours for emergency service	200 hrs/yr, included in permit condition	Yes
	100 hrs/yr for maintenance and testing	50 hrs/yr for maintenance and testing	Yes
	No peak shaving or demand response program	Included in permit condition. DRP not allowed as per Rule 1470	Yes
Compliance requirements	Initial notification if >500 HP at major source	Engine is located at area source	Yes
Notification	None	None	Yes
Reporting	None	None	Yes

REGULATION XXX:

This facility is in the RECLAIM program. The proposed project is considered as a "significant permit revision" for non-RECLAIM pollutants or hazardous air pollutants (HAPs), and a "minor permit revision" for RECLAIM pollutants to the RECLAIM/Title V permit for this facility.

Non-RECLAIM Pollutants or HAPs

Rule 3000(b)(31) specifies that a "significant permit revision" includes, but is not limited to any of the following:

- Rule 3000(b)(31)(B) – the addition of equipment or modification to existing equipment or processes that result in an emission increase of non-RECLAIM pollutants or hazardous air pollutants (HAPs) from all de minimis significant permit revisions in excess of any of the emission threshold levels in Table 1 of Rule 3000(b)(7).

- Rule 3000(b)(31)(C) - cumulative emission increases of non-RECLAIM pollutants or hazardous air pollutants (HAPs) from all de minimis significant permit revisions during the term of the permit in excess of any of the emission threshold levels in Table 1 of Rule 3000(b)(7).

Air Contaminant	Daily Maximum (lbs/day)
HAP	30
VOC	30
NOx*	40
PM_{10}	30
SOx*	60
CO	220

* Not applicable if this is a RECLAIM pollutant

- Rule 3000(b)(31)(I) – installation of new equipment subject to a New Source Performance Standard (NSPS) pursuant to 40 CFR Part 60, or a National Emission Standard for Hazardous Air Pollutants (NESHAP) pursuant to 40 CFR Part 61 or 40 CFR Part 63.

To determine if a project is considered as a "significant permit revision" for non-RECLAIM pollutants or HAPs, emission increases for non-RECLAIM pollutants or HAPs resulting from all permit revisions that are made after the issuance of the Title V renewal permit shall be accumulated and compared to the above threshold levels. This proposed project is the 1st permit revision to the Title V renewal permit issued to this facility on October 18, 2011. The following table summarizes the cumulative emission increases resulting from all permit revisions since the Title V renewal permit was issued:

Revision	HAP	VOC	NOx*	PM10	SOx	CO
1st Permit Revision, add ICE (Device no. D167)	0	0	7.6	0	0	0.75
Cumulative Total	0	0	7.6	0	0	0
Maximum Daily	30	30	40*****	30	60	220

* RECLAIM pollutant, not subject to emission accumulation requirements

Since the proposed project is subject to 40 CFR60, Subpart IIII and 40 CFR63, Subpart ZZZZ, it is considered as a "significant permit revision" for non-RECLAIM pollutants or HAP based on the definition in Rule 3000(b)(31)(I).

RECLAIM Pollutants

Rule 3000(b)(15)(A)(v) defines a "minor permit revision" as any Title V permit revision that does not result in an emission increase of RECLAIM pollutants over the facility starting Allocation plus nontradeable Allocations, or higher Allocation amount which has previously undergone a significant permit revision process.

Since NOx is a RECLAIM pollutant for this facility, a separate analysis shall be made to determine if the proposed permit revision is considered a "minor permit revision" for RECLAIM pollutants. Section B of the Title V permit shows that this facility's NOx starting Allocation plus the non-tradable Allocation is 55,155 pounds. The proposed project is expected to result in an increase of 7.6 lbs/day (382 lb/year) of NOx emissions from this permit revision, less than the starting Allocation plus the non-tradable Allocations of 55,155 pounds. As a result, this proposed project is considered as a "minor permit revision" for RECLAIM pollutants.

RECOMMENDATION

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a "significant permit revision" for non-RECLAIM pollutants or hazardous air pollutants (HAPs), all public participation procedures pursuant to Rule 3006(a) will be followed prior to the issuance of the permit. A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not have any objections within the review period, a revised Title V permit will be issued to this facility, with a Permit to Construct in Section H for this equipment.

nasa – 1st rev ice 540642